

Scientific journal
PHYSICAL AND MATHEMATICAL EDUCATION
 Has been issued since 2013.

ISSN 2413-158X (online)
 ISSN 2413-1571 (print)

Науковий журнал
ФІЗИКО-МАТЕМАТИЧНА ОСВІТА
 Видається з 2013.

<http://fmo-journal.fizmatsspu.sumy.ua/>



Каменева Т.М. Дидактика цифрового століття: питання та тенденції розвитку електронного навчання. *Фізико-математична освіта*. 2020. Випуск 4(26). С. 13-20.

Kameneva T. *Didactics of digital century: issues and trends of e-learning development. Physical and Mathematical Education*. 2020. Issue 4(26). P. 13-20.

DOI 10.31110/2413-1571-2020-026-4-002
 UDK 378.147

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DIDACTICS OF DIGITAL CENTURY: ISSUES AND TRENDS OF E-LEARNING DEVELOPMENT

ABSTRACT

Formulation of the problem. Revolutionary changes in society and education due to intensive implementation of new digital technologies suggest the revision of the traditional understanding of didactics as a science of teaching. Particularly, the widespread Web 2.0 applications have the capacity for educational institutions to extend the possibilities of e-learning. Such active approaches to learning as the professional communities' creation, the use of cloud computing, the development of mobile communications, thanks to which a large number of users have the opportunity to collect and visualize data, are becoming increasingly widespread. Consequently, development of pedagogy, which is aimed at educational goals of a higher level, is a driver of innovations in educational systems. Technologies and new modes of content delivery open up wonderful opportunities to rethink completely the teaching process. However, the traditional understanding of didactics does not meet the requirements of the digital society with the rapid development of digital technologies. This contradiction suggests that it is necessary to develop an orderly theoretical basis for e-learning — e-Didactics. Currency of the paper is conditioned by the problems of developing the theoretical basis of e-learning – electronic Didactics (e-Didactics), which corresponds to the modern conceptual understanding of the role of digital technologies in the educational process. Particular attention is paid to trends in the development of educational technologies and factors that oppose their introduction into the higher education sector. The objectives of the research are to (1) consider the way technology is changing educational process in the sector of high education, leading to the emergence of a new pedagogy, (2) examine recent tendencies in the development of educational technologies that will have the most significant impact on future educational processes in higher education.

Materials and methods. The process of scientific and pedagogical research was carried out using the methods of investigation. In particular, there were: analysis of scientific and educational literature on scientific research problem; comparative analysis of scientific data, generalization and systematization of pedagogical approaches concepts and practical experience of digital technologies, social media, and mobile devices implementation in teaching process, modelling of the didactic system of e-learning.

Results. The results of the research in terms of its objectives are: a) the key distinctions of e-Didactics from the traditional didactics were represented; b) instructional strategies, teaching methods and digital tools as a direction for the further development of e-didactics have been generalized; c) the most promising pedagogical approaches and trends which are contributing to the introduction of digital pedagogy into the higher education sector have been discussed.

Conclusions. The realization of the specific opportunities provided by digital technologies for education requires the transition of the didactic system of e-learning to a higher level of complexity, the use of new organizational forms and methods. The results of the research should be of help for educators, methodologists and instructors in the system of professional development of higher education, as well as for all those willing to master the new didactic approaches.

KEY WORDS: pedagogical approaches, teaching and learning (T&L), digital technology, educational system, instructional process, e-learning environment, virtual educational environment, assessment of learning outcomes, pedagogical interaction, digital instructional tools.

INTRODUCTION

Electronic didactics (e-Didactics) is in close correlation with the rapid introduction of the digital and telecommunication technologies in education. The transformation of e-learning environment creates new interpersonal communication conditions between teacher and students, new forms of designing, creating and evaluating teaching materials, and teaching tools acquire

new methodological and didactic properties. At the same time, the innovative potential of digital and telecommunication technologies fill education with new conceptual provisions. It is known that effective training is possible when practical activity is based on a modern theoretical and methodical platform. Theories about education will influence strongly the choice and use of different technologies (Bates, 2016). In the digital age, traditional learning theories – behaviourism, constructivism and cognitivism - are supplemented by new approaches, for example, connectivism, which suggests learning in the process of communication and connection within a distributed network (Bates, 2016; George Siemens, 2004; Romiszowski, 1993; Tchoshanov, 2013). These theories specify the goals of personality-oriented learning, and reflect the tactics of the educational process within technologies-enhanced learning environment. The place of e-Didactics in the education system is being actively discussed today by a number of authors (Pechnikov, 2013; Tchoshanov, 2013; Noskova, 2015,). In their opinion, the traditional understanding of didactics does not meet the requirements of the modern society with the rapid development of digital technologies.

Considering learning as a continuous rather than occasional process, a collaborative activity focusing on verifying knowledge, competence and capabilities rather than status within a group of learners, e-Didactics specifies the goals of educational process within technologies-enhanced learning environment, namely:

- focusing on the development of personality and individuality of a trainee, who can learn differently, with access to digital content, mobile delivery, new forms of assessment, learning analytics to guide choices and progress, and interaction and communication with peers around the world;
- changing instructional role towards more support and negotiation over content and methods;
- placing the responsibility on students to be active in the inquiry process;
- motivating independent extraction of knowledge from a variety of e-resources;
- moving towards resource-based rather than packaged learning.
- emphasis on students supporting each other through new social media, peer assessment, discussion groups;
- pedagogical emphasis is on the knowledge creation process, rather than subject content and
- optimal combination of individual and group work in different learning situations;
- assessment of students' learning outcomes not only for compliance with educational standards, but also as stages of individual personal growth of each student;
- competency-based assessment construction of learning process in different modes of the interactivity,

Recent innovations and developments in competency-based learning and assessment will give a new impetus to online learning and development of online learning environment. Bates (Bates, 2016) notes that online learning has the potential to support many different approaches to teaching (including didactic), but is particularly suited to current and emerging pedagogies. Online learning environment is characterized by intensive presentation of instructional materials in different formats; efficiency and extraterritoriality of information transfer of any size; unprecedented opportunities for updating the content of training; expansion of opportunities for cooperation and pedagogical interaction; active position of student and a high degree of self-sufficiency. Online learning environment is not involved just one environment but several environments including the WWW, e-mail, asynchronous discussion forum (e.g. BBS, mailing list and newsgroup) and synchronous discussion forum (e.g. online chat room, video conference and online games) and so on (Tsai, 2009; Miller & Miller, 2000).

Major researchers agreed that characteristics of online learning environment could be identified as follows

- *Flexible time and space*: The most significant revolution of e-learning is that e-learning overcome the limits of time and place for learning. Online learning tasks can be performed at any time or place provided they have Internet access. Online learning environments thus differ significantly from traditional learning environments, where teachers and students must meet regularly at a specific place and time. Online learners become more free, flexible and convenient in time and location of learning. That is, students gain more locus of control than learning in traditional environments (Miller & Miller, 2000).
- *Indirect Social Interaction*: The absence of face-to-face interaction is one of most criticized features of learning via the Internet. The isolation of online learning was one of the main frustrations associated with online learning before synchronous communication technologies (e.g. video/audio conference) significantly accelerated the processing of multimedia signals. And asynchronous communication applications (e.g. online discussion board, e-mail, blog, BBS etc.) are still used popularly in schools. The roles of teachers in an online learning environment become more like facilitators and helpers. The above challenges require students for new strategies to cooperative and negotiate with others via the Internet (Noskova, 2015).
- *Abundant Information Resources*: The abundance and variety of information resources is the greatest advantage of Internet-based learning. Online learners can easily and quickly search for information they need but simply copy and paste it for their assignments. How to process and utilize online information is a new issue for online learners (Tsai, 2009).

These issues put forward new requirements for the teacher and his professional activities. Teachers need to learn new information and digital technologies more actively. In addition, new research is needed in the field of the psychology of perception and thinking with the active use of e-learning.

The purpose of the article. With this in mind, the aims of the article is 1) to highlight the way technology is changing all components of didactic system, leading to the emergence of a new pedagogy; 2) to summarise the current changes in didactics and analyse the structural components of didactic system of E-learning; 3) examine the tendencies in the development of educational technologies in order to design effective learning environments.

METHODS OF THE RESEARCH

The process of scientific and pedagogical research was carried out using the methods of investigation. In particular, there were: analysis and generalization of psychological and pedagogical literature on the research problem; comparative analysis of philosophical, psychological, pedagogical and methodological studies of e-learning problems; generalization and systematization of concepts and practical experience of digital technologies, social media, and mobile devices implementation in teaching

process, modelling of the pedagogical communication structures in the environment of e-learning. The sources of research were the works of Ukrainian and foreign scholars on didactics, textbooks on Pedagogy of the twentieth century, UNESCO recommendations on the development of instructional strategies.

RESULTS OF RESEARCH

The specific pedagogical and methodical features of the current dynamic digital environment significantly influence the instructional process as a whole and leads to changes in the activities of both the student and the teacher. The teacher does not act as a transmitter of knowledge and information, but as a consultant, assistant, student's partner and coordinator of the cognitive process, while the student is an active participant of instructional process aimed at the conscious development of professional competencies. Along with changing teacher's and student's roles in e-Didactics from face-to-face to blended and online, the primary mode and means of pedagogical communication and assessment are also experiencing a significant change: from oral classroom discourse to written exchange of ideas via online discussion, chats, and social networks. Moreover, it can not only ensure the active involvement of students in the instructional process, but also allows them to manage this process, unlike most traditional educational environments. All above-listed requires a transition of e-learning didactic system to a higher level of complexity, the organic incorporation of innovative approaches to teaching, significant changes in learning objectives and the relationships between participants in instructional process, the use of new organizational structures, methods and innovative teaching techniques.

E-learning didactic system, as each instructional system in which the educational process occurs, cannot be considered beyond the context of such didactic concepts as "teaching goals and objectives", "content and assessment of learning outcomes", "e-learning methods and instructional tools", "instructional strategies and "modes of e-learning process". Within each of the main components there are a set of sub-components that will need to be considered. In fact, it is in the sub-components (content structure, practical activities, feedback, technology choice, assessment methods, and so on) where the real decisions need to be made (Bochkov, Krasnova, Filippov, 2008).

Effective achievement of learning objectives is provided by a combination of methods, tools and adequate instructional strategies supported by appropriate technological devices and electronic instructional tools. In turn, carefully worked out teaching goals serve as the basis for:

- designing interactive content and relevant learning experiences;
- selecting and implementing online and offline tools;
- modelling structures of pedagogical interactions among students and teachers;
- integrating instructional strategies and methods;
- searching of sources for performance of educational tasks;
- developing criteria for assessment of learning outcomes;
- choosing an appropriate instructional model (Kameneva, 2017).

Let's have a closer look at how technologies influence the key characteristics of e-Didactics.

Traditional didactics has as its main goal the *creation of T&L process aimed at developing the desired level of students' competency and proficiency through* assimilating knowledge, skills and abilities. The primary goal of e-Didactics is *creation of T&L process* as a system of knowledge, which is focused on intellectual potential of the student's personality realization aimed at implementing the strategy of "lifelong learning" in the emerging knowledge society. The difference in goals influences the key distinctions of e-Didactics from the traditional didactics stipulated by changing:

- content delivery format, involving the access to free electronic resources;
- forms of pedagogical interactions and relationships;
- dominating mode of learning;
- channels of communication;
- means of assessment and modes of students' learning outcomes control.

Thus, the understanding of the notion "e-Didactics" should be found in the context of the specific e-learning didactic system.

Content. Issues around content remain critically important in teaching: what content should be included in the curriculum, what content sources students should access, and so on. Content includes a variety of learning materials such as modules, activities, readings, discussions, assignments, assessments, and other items to support learning objectives of the course (Kameneva, 2017). One way to handle the problem of knowledge explosion is to focus on the development of skills, such as knowledge management, problem-solving and decision-making (Bates, 2016). Modular design is one of the most effective approaches used in the content development, particularly, in the design of online learning content. Learning management systems such as Blackboard or Moodle enable instructors to select and sequence content material, which students can access anywhere, at any time – and in any order.

Instructional strategies and methods. Overall instructional strategies are the translation of a philosophical or theoretical position regarding instruction into a statement of the way in which instruction should be carried out in specific types of circumstances (Romiszowski, 1993). There is a groundswell of change taking place in instructional strategies. The set of instructional strategies to support e-learning with web 2.0 tools includes the following: *Project management; Peer teaching; Case solving; Peer-2-peer learning; Work-integrated learning; Collaborative learning; Blending learning; Community of learning; Mobile learning; Self-regulated learning; Learner-centred instruction; Student generated content; Informal learning; Personalisation; Reflective learning; Experiential learning.* Based on active learner's cognitive interaction with different learning materials and Internet resources, e-learning methods tend to minimize expository methods oriented towards collective perception of information commonly used in traditional didactics. The range of e-learning methods includes the following: *multimedia lectures of teachers and multimedia presentations of students, electronic testing, "student's Electronic Portfolio", electronic case,*

telecommunication projects, business computer games, simulations, brainstorming, problem discussions. The application of these methods changes the priorities of mastering the advanced knowledge in the process of classroom work towards the student's individual and cognitive activity, taking into account his/her features and capabilities (Kameneva, 2015).

Assessment of learning outcomes. Assessment of learning outcomes is considered as one of the key didactical components that directly affect the effectiveness of learning. Design of assessment could be based on different learning attributes such as: outcome (outcome-based assessment); standards (standards-based assessment); competency (competency-based assessment); performance (performance-based assessment), etc. The ultimate goal of digital age assessment is to strengthen student's responsibility for the process and outcome of self-learning. Digital age requires radical revision of the traditional philosophy of assessment: from fixed — to flexible assessment; from standardized — to authentic assessment; from external — to self-assessment (Tchoshanov, 2013). Using online assessment tools such as online quizzes to provide instant feedback and repeated testing opportunities for practicing purposes may help students learn the subject matter more thoroughly. This method also leads to more class time for student-student and student-teacher interaction.

Organizational modes of training. Traditional didactics has produced a great variety of organizational modes of training: lectures, consultations, seminars, colloquiums, practical classes, laboratory works, independent study, discussions, and controlled exercises. Network communication technologies application (interactive databases; telephone conferences; video/ audio conferences; web forums; chats; blogs; Internet portals; wikis; electronic mailing lists; white boards; newsgroups; mental maps; social networks), led to the further expansion of the basic structures of training due to the emergence of new organizational structures. These include the following: *multimedia lecture; off-line video lecture for distributed student groups; virtual seminars (webinars); virtual laboratory workshop; group tutorials; individual consultations in "off-line" mode; electronic testing; electronic discussions.*

Selecting and implementing digital instructional tools. It is natural to assume that realization of the key distinctions of e-Didactics mentioned above requires a new generation of digital instructional tools, each of which has specific didactic capabilities, functions and objectives and are significantly different from the properties of traditional instructional tools. Innovative didactic properties of digital tools should be identified by studying the characteristics of the format in which the teaching materials are implemented. Analysis of possible instructional process models shows that digital instructional tools are the part of various e-learning models and act, on one hand, as teaching materials medium, and, on the other hand, as elements of the learning process management system (Lynch, 2020). The challenge is to balance the preferred instructional strategies against the advantages and disadvantages of available online instructional technology.

The main procedural components of instructional process realization in e-Learning environment are as following:

- content delivery component – provides a range of ways to deliver educational, scientific, informational, reference materials, presented on media of any type or placed in computer networks, which are necessary for the effective organization of the educational process, (additionally, if content is delivered in parallel forms both through traditional means and through using online tools such that students have the opportunities to learn in their preferred modes, some students may become more aware of their own cognitive processes);
- monitoring and management component – focuses on correlation of the set of learning objects with the outcomes learning outcomes;
- communication component – focuses on pedagogical interactions with peers and teachers to provide informational and procedural support through new social media, peer assessment, discussion groups;
- collaboration component – addresses building a community of teachers and students through dialogue, testing of ideas, problem-solving and knowledge construction; for example, collaborative workspaces such as wikis are free and simple to create, and allow students to work on joint projects; multimedia archives such as YouTube videos can be accessed as learning resources and created by students to demonstrate knowledge and skills; and virtual worlds, such as Second Life, enable knowledge construction through interaction and experimentation in real time.
- control and assessment component – addresses analyzing the quality of student' knowledge, including self-diagnostics of student' own results.

Various online tools exist to help in these components. The following classification of digital tools and online services by each identified component will demonstrate how tools could be incorporated to meet certain methodological functions of e-Learning environment to enhance instructional process (see Table 1).

Table 1

Classification of digital technologies and online services by functions in e-Learning environment

Functional components of online environment	Objectives of e-Didactics	Types of technologies and online services	Tools and instruments
Content delivery and representation	▪guiding students to find, analyze, evaluate, and apply information relevant to a particular subject domain;	digital collections of educational objects of various formats	Google Drive, Dropbox, OneDrive
	▪ enabling students to construct knowledge	tools for creating and publishing content;	Pear Deck; Nearpod;
	▪ providing flexibility and wide access to resources and experts; ▪ OER in the form of short lectures, animations, simulations, virtual labs, virtual worlds and many other formats can be provided as core course content	Open educational recourses	OpenCourseWare

Functional components of online environment	Objectives of e-Didactics	Types of technologies and online services	Tools and instruments
Communication	<ul style="list-style-type: none"> emphasis on enabling students to construct knowledge through questioning, discussion, sharing of perspectives and sources, analysis of resources from multiple sources, and instructor feedback; 	Tools for communication and feedback	Flowdock; Slack; Zoom; GoToMeeting; WebEx; Appear.in; Yammer ; Skype; Hipchat;
Control and assessment	<ul style="list-style-type: none"> peer’s control and self-control within the framework of common values and meanings shared by the group prevail; On-line assessment in the form of student contributions to online discussion; 	Tools for digital e-testing	Mentimeter; Kahoot; Google Forms; EDpuzzle; Poll Everywhere ;
	<ul style="list-style-type: none"> e-portfolios of work through the collection, storing and assessment of a student’s multimedia online activities 	Self-control, e-Portfolios, Peer-to-Peer Assessment, “On Demand” assessment, Video-Based Assessment of Competencies	
Collaboration	<ul style="list-style-type: none"> development of communities of practice, where students share experiences, discuss theories and challenges, and learn from each other. 	Tools for creating communities	Google Docs; Office Online; Wiki; Quip; Concept Inbox; Cisco WebEx
			social networks (Facebook and Twitter); blogs, wikis, text or voice messages on mobile phones

The role of crucial importance in e-Didactics belongs to asynchronous and synchronous communication tools, which are determined by the purpose, conditions and circumstances of their interaction (Horton & Horton, 2005). The telephone, video-conferencing, e-mail, online discussion forums, most social media and the Internet are examples of communicative media or technologies, in that all users can communicate and interact with each other.

DISCUSSION

The transformation of pedagogy, which emphasizes not only learner's mastering knowledge and skills, but also developing his/her personality, as well as the availability of technologies suitable to support them, is beginning to transform the higher education system. Aligning pedagogy, subject matter, assessment, and student access and success with appropriate technologies, software, and instructional strategies is the ongoing challenge of teaching and learning in the digital age. In this regard, the urgent need today is to find the most effective online strategies that can help solve this problem. The most promising instructional strategies which are contributing to the development of digital pedagogy are identified as follows:

- *Blended Learning*. The Blended Learning paradigm is based on an organic combination of traditional teaching methods with online learning. Blended learning combines face-to-face (F2F) instruction with computer-mediated learning (CML) and coaching to provide three main benefits for e-learning: (a) improved pedagogy, (b) increased access and flexibility, and (c) increased cost effectiveness (Lynch, 2020). Considering teaching and learning methods when incorporating interactive training tools can help a teacher better meet student learning needs. Creating an effective e-learning environment therefore requires deciding which course components may best be done online and which can be done more effectively in the traditional classroom.

- *Communities of Learning and Practice*. From the early days of online learning, there was an emphasis on enabling students to construct knowledge through questioning, discussion, sharing of perspectives and sources, analysis of resources from multiple sources, and instructor feedback. Social media encouraged the development of communities of practice, where students share experiences, discuss theories and challenges, and learn from each other. As the potential of social participatory media becomes more evident in the current dynamic digital environment, it is essential to prepare students with the skills needed to operate in a web-based world, to become collaborators.

- *Microlearning* (Anywhere, Anytime, Any Size Learning). Microlearning as an approach is a concept of mastering any knowledge in small units. More often this term is used in the field of e-learning and related fields in the sense of a new paradigmatic point of view on learning processes in a mediated environment at the micro-levels. The development of ‘any size’ learning is manifested in the creation of smaller modules. There is growing demand from students for short, ‘just in time’ training modules that fit an immediate learning need. The creation of these modules requires a revision of course structure and learning credits, which are not equivalent to a full course completion. These smaller modules meet the needs of many full-time students who are working part-time, as well as those needing greater flexibility or additional help with their learning. It deals with relatively small teaching units and short-term teaching activities. In contrast to “traditional” approaches to e-learning, microlearning is often aimed at advancing technology through push media, which reduces the cognitive load on learners.

- *Mobile learning (Learning-on-the-Go)*. The growth of mobile technologies such as smartphones, internet-connected tablets, GPS systems, video games is the basis of on-the-go learning provided through online learning. Offering content, quizzes, multimedia resources and connections among students using mobile devices requires a fresh look at course design, content packaging, and a consideration of data packages limitations. M-Learning is growing and adapting both to the needs of students, the changing landscape for learning and developments in technology. Like other forms e-learning, mobile learning is also collaborative; sharing among all users of the same content is almost instantaneous, resulting in instant feedback and advice. Universities that have adopted m-learning and blended learning strategies have seen an increase in student enrollment, wider levels of adoption of technology to enable learning among faculty members, and a higher level of student engagement with technology.

- *Use of Multimedia and Open Educational Resources (OER)*. Open educational resources (OER) cover a wide range of online formats, including online textbooks, video recorded lectures, YouTube clips, web-based textual materials designed for independent study, animations and simulations, digital diagrams and graphics, some MOOCs, or even assessment materials such as tests with automated answers. OER has become a major resource for rapid course development and for lowering the costs of learning for many students. Even text books are changing to *incorporate video and audio clips, animations and rich graphics*, as well as becoming more interactive, allowing both instructors and students to annotate, add or change material including assessment exercises and feedback. Balancing the use of multimedia and open educational resources with instructor-delivered content raises issues of measurable learning outcomes.

- *Student Control and Independence*. Students have tools, such as smart phones and video cameras, to collect digital examples and data can be edited and used in student work. Thus, strictly managing a set curriculum in terms of limited content chosen by the instructor becomes less meaningful. Within the framework of the learning objectives, more flexible approaches to content choice, delivery, assessment, and other factors are emerging. Equally important is educating students to take responsibility for their own learning and approach this as a skill to be taught and learned. This approach challenges the instructor to move away from selecting and transmitting information in large blocks or chunks, such as a one-hour lecture to *guiding students to find, analyze, evaluate, and apply information relevant to a particular subject domain*.

- *Virtual Worlds*. Virtual worlds based on Web 2.0 have the potential to provide: teaching, learning, and training opportunities; rich interactions and communication environments to improve communication skills and problem-solving skills, and an engaging and low risk environment as an alternative to the real world. A virtual world usually refers to the online community that often takes the form of a computer-based simulated environment, through which users can interact with one another and use and create objects. Virtual worlds are intended for users to inhabit and interact, and the term today has become largely synonymous with interactive 3D virtual environments, where the users take the form of avatars visible to others graphically (Cook, 2009).

CONCLUSIONS AND PERSPECTIVES FOR A FURTHER RESEARCH

The range of questions considered within the framework of this article allowed to set forth the row of conclusions.

Firstly, an increased use of technology is changing the way of teaching and learning, leading to the emergence of a new pedagogy. The development of the e-Didactics offers new opportunities for further understanding of learning and teaching in the digital age and creating effective digital environment.

Secondly, e-Didactics, based on concepts of current learning theories which suggest learning in the process of communication and connection within a distributed network, and having innovative properties due to new applications of technology, is the foundation for the actualization of modern theory of learning.

Thirdly, aligning pedagogy with appropriate technologies is the main cause of the gap between the potential and real possibilities of using digital technologies in higher education. In this regard, the urgent need today is to find the most effective online strategies that can help solve this problem. Consideration of various aspects of online learning environment and the analysis of the components of the e-learning didactic system opens new opportunities for teachers not only to support and assist, but also to provide new forms of student assessment.

The results of the research should be of help for educators, methodologists and instructors in the system of professional development of higher education, as well as for all those willing to master the new didactic approaches. However, one study focusing on these areas cannot completely capture the dynamics that happen within e-learning. In that sense, this study suggests further research should be followed.

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ДИДАКТИКА ЦИФРОВОГО СТОЛІТТЯ: ПИТАННЯ ТА ТЕНДЕНЦІЇ РОЗВИТКУ ЕЛЕКТРОННОГО НАВЧАННЯ

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Анотація. Революційні зміни в суспільстві та освіті, що відбуваються в останні 10-15 років внаслідок інтенсивного впровадження нових цифрових технологій, передбачають перегляд традиційного розуміння дидактики як науки про навчання. Зокрема, широко розповсюджені застосунки Web 2.0 дозволяють освітнім установам розширити можливості електронного навчання. Отже, електронне навчання як нова форма навчання, основна мета якого полягає в об'єднанні переваг віртуального і традиційного навчання, стало однією з найбільш захоплюючих, динамічних і разом з тим складних областей, з якими стикається інформаційне суспільство. Мультимедіа в Інтернеті, телекомунікації, портативна електроніка, програмне забезпечення соціальних мереж, Web 2.0 тощо - все це радикально змінює способи отримання інформації людьми і способи учіння та навчання. Тому розвиток педагогіки, яка спрямована на освітні цілі більш високого рівня, є драйвером інновацій в освітніх системах. Електронна дидактика (e-Дидактика) знаходиться у тісному взаємозв'язку із швидким впровадженням цифрових та телекомунікаційних технологій в освіту. Трансформація електронного навчального середовища (ЕНЕ) створює нові умови для міжособистісного спілкування між викладачем та студентами, нові форми проектування, створення та оцінювання навчальних матеріалів, а засоби навчального призначення набувають нових методологічних та дидактичних властивостей. Проте той факт, що викладач використовує цифрові матеріали або електронні інструменти, не обов'язково означає, що він / вона застосовує сучасні педагогічні підходи, розроблені для використання цифрових технологій у навчальному процесі вищих навчальних закладів. Ключові відмінності електронної дидактики від традиційної дидактики визначаються не стільки технологічними інструментами, скільки новим форматом навчання, включаючи доступ до безкоштовних електронних ресурсів, контроль результатів навчання студентів на відстані, організацію асинхронних та синхронних взаємодій через різні телекомунікаційні канали. Критичним стає питання, про те на яких ключових елементах електронного навчання необхідно зосередити увагу.

Формулювання проблеми. Актуальність статті зумовлена проблемами розробки теоретичної основи електронного навчання — електронної дидактики (e-Didactics), яка відповідає сучасним концептуальним уявленням про роль цифрових технологій в освітньому процесі. В статті проаналізовано сучасні тенденції та виклики у розвитку освітніх технологій у світі, фактори які пришвидшують і протидіють їхньому впровадженню, а також їх вплив на практику у галузі вищої освіти. Завданнями дослідження є такі: (1) розглянути як застосування технологій змінює освітній процес у секторі вищої освіти, що призводить до появи нової педагогіки; (2) огляд останніх тенденцій у розвитку освітніх технологій, які матимуть найбільш відчутний вплив на майбутні освітні процеси у вищій школі.

Матеріали і методи. Процес науково-педагогічних досліджень здійснювався з використанням методів дослідження. Зокрема, були: аналіз наукової та навчальної літератури з проблеми науково-дослідних робіт; порівняльний аналіз наукових даних, узагальнення та систематизація концепцій педагогічних підходів та практичного досвіду впровадження цифрових технологій у навчальний процес, моделювання дидактичної системи електронного навчання.

Результати. Результати дослідження з огляду на поставлені цілі є: а) представлено ключові відмінності електронної дидактики від традиційної дидактики; б) узагальнено навчальні стратегії, методи навчання та цифрові інструменти як напрямки подальшого розвитку e-дидактики; в) обговорено найбільш перспективні педагогічні підходи та тенденції, що сприяють впровадженню цифрової педагогіки у сектор вищої освіти. Результати дослідження повинні допомогти викладачам, методистам та викладачам у системі професійного розвитку вищої освіти, а також усім бажаючим освоїти нові дидактичні підходи. Результати дослідження повинні допомогти викладачам, методистам та викладачам у системі професійного розвитку вищої освіти, а також усім охочим оволодіти новими дидактичними підходами.

Висновки. По-перше, посилене використання технологій змінює спосіб учіння та викладання, що призводить до появи нової педагогіки. Розвиток електронної дидактики пропонує нові можливості для подальшого розуміння навчання та

викладання в епоху цифрових технологій та створення ефективного цифрового середовища. По-друге, електронна дидактика, яка ґрунтується на концепціях сучасних педагогічних теорій, що передбачають навчання в процесі спілкування та зв'язку в розподіленій мережі, та володіє інноваційними властивостями новітніх цифрових технологій, є основою актуалізації сучасної теорії навчання. По-третє, узгодження педагогіки з відповідними технологіями є основною причиною розриву між потенційними та реальними можливостями використання цифрових технологій у вищій освіті. Розгляд різних аспектів навчального онлайн середовища та аналіз компонентів дидактичної системи електронного навчання відкриває викладачам нові можливості не лише для підтримки та допомоги, але й для надання нових форм оцінювання студентів.

Ключові слова: педагогічні підходи, навчання та учіння, цифрові технології, система освіти, навчальний процес, середовище електронного навчання, віртуальне освітнє середовище, оцінка результатів навчання, педагогічна взаємодія, цифрові навчальні засоби.